CLAIMS

1. Device for mixing and distributing a dense, generally liquid, fluid and a light, generally gaseous, fluid, placed in a reaction chamber upstream from a granular bed or between two successive granular beds, the said device comprising:

- a more or less horizontal plate (62), covering all of the section of the reaction chamber and supporting
- a multiplicity of substantially vertical pipes (60) including an upper end communicating with the part of the reactor situated above the plate (62), a lower end communicating with the part of the reactor situated below the plate (62), the said pipes being pierced by lateral orifices (63) permitting the introduction of the dense fluid and of some of the light fluid inside the said pipes (60), the said device being characterized by a tubular system (50) for the introduction of the dense fluid from outside the reactor into a volume between the plate and the level of at least one lateral orifice (63) of the pipes in contact with the dense fluid, the tubular system having exit slots for the dense fluid that are wholly immersed in the said volume surmounting the plate (62).

2. Mixing and distribution device according to claim 1 in which the tubular system is situated at a level next to the level of the plate.

3. Device according to claim 1 in which the density of the pipes is between 100 and 700 per m^2 of reactor section, and preferably between 150 and 500 per m^2 of reactor section.

4. Device according to claim 1 in which the lateral orifices (63) are distributed along the pipes (60) on several levels, the lowest level being situated at a distance of between 100 and 300 mm relative to the level where the tubular system (50) discharges.

5. Device according to claim 1 in which the pipes (60) are extended by a distance h below the level of the plate (62), this distance h preferably being between 10 and 100 mm.

6. Device according to claim 1 in which the distance (d) separating the lower end of the pipes (60) from the upper level of the bed situated immediately below is between 0 and 50 mm, excluding 0, and preferably between 0 and 20 mm, excluding 0.

7. Device according to claim 1 in which the tubular system (50) comprises a more or less vertical principal tube and a multiplicity of more or less horizontal secondary tubes (51) fitted with exit orifices (54).

8. Device according to claim 1 in which the tubular system (50) comprises a more or less vertical tube fitted at its lower end with lateral slots (53) situated at a distance, relative to the lowest level of the lateral orifices (63) of the pipes (60), of between 100 mm and 500 mm.

9. Device according to claim 7 in which the exit orifices (54) of the secondary tubes (51) are directed downwards forming an angle relative to the vertical which is between -90 and +90° and preferably between -45° and +45°.

10. Device according to claim 7 in which the exit orifices (54) of the secondary tubes (51) have the form of a nozzle with a more or less constant section.

11. Device according to claim 7 in which the exit orifices (54) of the secondary tubes (51) have the form of a nozzle with a variable section so as to present, in the direction of flow of the liquid, a convergent part followed by a divergent part.

12. Device according to claim 1 in which the lateral orifices (63) of the pipes (60) are distributed over at least two levels, the said levels being spaced at least 20 mm apart from each other.

13. Device according to claim 1 in which the maximum width of the passage sections (63), or their diameter when they are circular, is less than 75% of the diameter of the pipes (60) and greater than 2 mm.

14. Device according to claim 1 in which there is added at the top of the reactor a system (200) for separating the gas and liquid phases when the fluids to be distributed are introduced in a mixture, the said separation system comprising a cylindrical tube (210) with internal fittings permitting a rotation and a separation of the said mixture.

15. Device according to claim 14 in which the separation system (200) has from 1 to 4 tangential exits for the liquid phase (215) and for the gas phase (230), the ratio of the total area of the exit sections of the gas (230), that is to say the sum of the areas of the sections (230) divided by the area of the section of the tube (210) being between 0.5 and 4 times the passage section of the cylindrical tube (210), and preferably more or less equal to 2.

16. Device according to claim 14 in which the tangential exits (215) for the liquid and (230) for the gas of the separation system (200) are spaced at a distance (p) greater than 50 mm and preferably between 100 mm and 300 mm.

17. Device according to claim 14 in which the cylindrical tube (210) of the separation system (200) contains a screw the pitch number of which is between 1 and 6, and preferably between 2 and 3.

18. Use of the device according to claim 1 in a hydrotreatment process for hydrocarbons.

19. Use of the device according to claim 18 in descending gas and liquid co-current reactors in which the volume ratio of gas to liquid is between 0 and 400, excluding 0.

20. Use of the device according to claim 19 in descending gas and liquid co-current reactors, the liquid flux being between 0.5 and 100 kg/m^2/second and preferably between 10 and 80 kg/m^2/second.